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ABSTRACT

This study was designed to investigate preschoolers' comprehension of five types of "wh-questions": who, what, why, where, and when. Eighty urban, black, 3- to 5-year-old preschool children were divided into four age groups: early 3's, late 3's, early 4's, and late 4's, with 10 boys and 10 girls in each group. Subjects were presented with a black and white drawing of an event in progress and were asked a "wh-question" about the event. Two sets of pictorial stimuli were used. The first, Single Option Stimulus, was designed so that only the information needed to answer one "wh-question" was presented. The second, the Multiple Option Stimulus, was constructed in such a way that more than one type of "wh-question" could be answered. Responses were scored as either correct or incorrect. An analysis of variance supported the hypothesis that there are developmental differences in children's ability to comprehend "wh-questions." The results of the Tukey post-hoc test reveal a significant age by wh-word type interaction: 3-year-olds responded correctly less frequently than 4-year-olds when responding to who, what, and why questions. No differences were found for where and when questions, which appeared to be too difficult for all four age groups. The results suggest that those who are being trained to interact with 3-to-4-year-old children (e.g., parents, preschool teachers) should be aware of the developmental limitations to various types of questions posed and should be trained as to how to most effectively question various age groups. (Author/BN)

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DEVELOPMENTAL DIFFERENCES IN PRESCHOOLERS' COMPREHENSION OF WH - QUESTIONS

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ABSTRACT

This study was designed to investigate preschoolers' comprehension of five types of wh-questions (who, what, why, where, and when). Eighty Urban Black preschool boys and girls between the ages of three and five years were divided into four age groups (Early 3's; Late 3's; Early 4's; Late 4's) with 10 boys and 10 girls in each group. In order to assess their performance, there were two sets of pictorial stimuli utilized; Single Option Stimulus, designed such that only the information to answer one wh-question was presented and Multiple Option Stimulus, designed such that more than one type of wh-question could be answered. Significant differences were revealed for age and interaction of age by wh-word type.

Introduction

Recent developments in education have placed heavy emphasis on trying to identify specific competencies that a teacher should possess. According to Carin and Sund (1979) people often rank as primary importance the teacher's ability to interact with students in personal, humane ways. Studies of teacher-student interactions have shown that teachers spend 70 to 80 percent of their time asking questions. The assumption is that students understand these questions and have the ability to give appropriate responses.

Several scholars have stressed the importance of asking and using questions in the classroom (Sanders, 1966; Hunkins, 1972; Hildebrand, 1976; Bloom, 1972). Although the literature related to teachers' question asking behaviors is extensive, relatively few studies have focused on preschoolers' comprehension of questions, specifically, wh-questions (Ervin-Tripp, 1970; Cairns and Hsu, 1978; Tyack and Ingram, 1977; Gullo, 1979, 1982). A primary objective of previous wh-question comprehension studies was to examine the sequence in which preschoolers correctly responded to wh-questions (Ervin-Tripp, 1970; Tyack and Ingram, 1977; Cairns and Hsu, 1978; Gullo, 1979, 1982).

In a review of the literature related to preschoolers' comprehension of wh-questions, there is no empirical evidence that has documented the ability of Urban Black preschoolers to give appropriate responses to oral wh-questions (Ervin-Tripp, 1970; Cairns and Hsu, 1978; Tyack and Ingram, 1977; Gullo, 1979, 1982).

This study was designed to examine whether there were developmental differences in Urban Black preschool boys and girls between the ages of three and five years rate of appropriate responses to oral wh-questions (who, what, why, where, and when) when pictorial stimuli was presented based on age group (Early 3's; Late 3's; Early 4's; Late 4's).

Subjects

Eighty Urban Black preschoolers were selected by the directors from four local Head Start centers in Columbus, Ohio, to participate in this study. There were a total of 40 boys and 40 girls divided into two treatment groups. Group A (the first two centers tested) consisting of 20 boys and 20 girls received the Single Option Stimulus first, followed by the Multiple Option Stimulus, while the subjects in Group B (the last two centers tested) received the reverse (Multiple Option Stimulus first, followed by the Single Option Stimulus). The subjects ranged in ages from 3.0 - 5.0 years old. The investigator received written consent from the Head Start agency and the parents.

Pictures

In previous studies various modes of pictorial stimuli were administered in order to assess the preschoolers' ability to comprehend the wh-questions. For example, Ervin-Tripp (1970) used a picture book; Tyack and Ingram (1977) utilized photographs; Cairns and Hsu (1978) administered video-tapes, while Gullo (1979; 1982) presented black and white line illustrations as the stimulus for examining wh-questions comprehension and response patterns.

In this study, there were ten pictures in the Single Option Stimulus Condition

(pictures designed such that only one type of wh-question could be answered from the information presented). Examples of two Single Option Stimulus condition pictures are shown in Figures 1 and 2.

Each multiple option picture was shown twice with a different wh-question asked at each showing. Thus, a total of ten pictures were used in the Multiple Option Stimulus Condition. An example of a Multiple Option Stimulus Condition picture is shown in Figure 3.

Figure 1. Example of a picture in the Single Option Stimulus Condition for a "who" question.

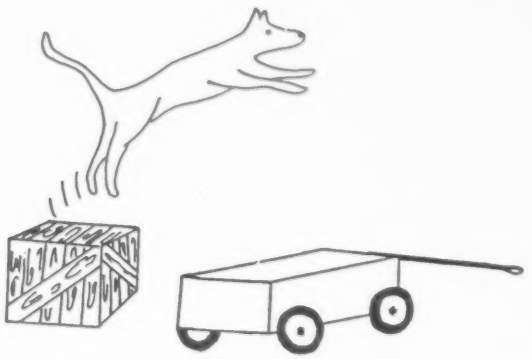

Figure 2. Example of a picture in the Single Option Stimulus Condition for a "what" question.

Figure 3. Example of a picture in the Multiple Option Stimulus Condition for a "who" and "what" question.

The criteria for drawing the pictures was consistent with Gullo's (1979; 1982) guidelines, except for one major change. The pictures were changed to represent two cultural groups (Blacks and Whites) as opposed to all White Americans. According to Banks (1983) there should be a strong attempt by educators to expose people (especially young children) to the notion of multi-ethnic portrayals when using pictorial media to foster a more multi-cultural perspective. Therefore, a strong effort was made by the investigator to include a more culturally diverse selection of stimulus in this study, because there were no pictorial illustrations that depicted Black Americans in previous comprehension studies (Gullo, 1979; 1982).

The other guidelines for designing the pictures in this study were:

1. The mode of presentation of pictorial stimuli were simple black and white drawings due to the perceptual development of the preschool child (Elkind, 1967).

2. The objects and actions represented were the central figure in the picture because preoperational children tend to focus their attention on the center of pictorial displays (Piaget, 1962).

3. Each scene in the picture was designed to depict information appropriate for answering the Single Option question or the Multiple Option Stimulus questions (Gullo, 1982).

4. Life-like situations were pictorially represented. To insure that the

questions asked were realistic and reflected true-to-life situations, two verbs (jumping, running) and three nouns (boy, girl, dog) were depicted in the pictures (Ingram and Tyack, 1977; Gullo, 1982). This decision was based on the idea that if a small number of nouns and verbs were used, the chances of the children giving appropriate responses would be better because the complexity of trying to process the sentence would not be a major factor in answering the questions.

Questions

A question is a verbal utterance that seeks a response from the person to whom it is directed (Cunningham, 1972, p. 85). Traditionally, questions have been used to determine what students have already learned. As Cunningham (1972) indicates, questions asked and used in an effective way facilitate development of desirable attitudes, develop and sustain interests, provide new ways of dealing with subject matter, and give quality and purpose to evaluation (Cunningham, 1972, p. 85). The investigator defines a wh-question as a verbal utterance that begins with an interrogative term such as "who," "what," "why," "where," and "when," that seeks a specific type of response. Examples of wh-questions are as follows:

"Who is the dog jumping?"

"What is the girl jumping?"

"Why is the boy running?"

"Where is the girl jumping?"

"When is the boy jumping?" (Gullo, 1979, p. 68).

There were ten wh-questions used in each treatment condition (See Appendix) for Single Option Stimulus Condition and Multiple Option Stimulus Condition Questions. There were two questions for each of the five wh-word types (who, what, why, where, when). An example is: "What is the dog jumping?" and "What is the girl jumping?".

In order to control for the syntactic complexity of the questions, a noted problem in a previous comprehension study (Ervin-Tripp, 1970), the same question frame was used for all questions (Ingram and Tyack, 1977). All of the wh-questions asked in this study followed the same syntactic frame:

wh-word + is + the + noun + verb + ing. For example: Who is the dog jumping?, and Why is the boy running?

Scoring Procedure

Responses to wh-questions (who, what, why, where, and when) were scored categorically appropriate or inappropriate by using the following scoring procedures adapted from Tyack and Ingram (1977) in order to determine the sequence in which the preschoolers understood the wh-questions:

1. A categorically appropriate response to a "who" question (i.e., "who" is the dog jumping?) included nouns such as the boy, girl, man, lady, mother, father, brother, or sister. "Who" questions required an animate or inanimate human response.

2. A categorically appropriate response to a "what" question (i.e., "what" is the dog jumping?) included nouns such as the box, wagon, fence, or rope. "What" questions required an inanimate or nonhuman noun response.

3. A categorically appropriate response to a "why" question (i.e., "why" is the boy running?) included answers such as "cause," "because," "to run from the dog," "to help clean up the glass." "Why" questions required a casual response.

4. A categorically appropriate response to a "where" question (i.e., "where" is the girl jumping?) included answers such as "there," "at the table," "in front of the house," or "on the ground." "Where" questions required a location response.

5. A categorically appropriate response to a "when" question (i.e., "when" is the dog jumping?) included answers such as "now," "at lunch time," or "at night." "When" questions required a response indicating time.

Responses could be verbal or nonverbal (pointing) because preschoolers tend to use nonverbal gestures when they are unable to articulate their thoughts, ideas, and feelings (Robison, 1983). In addition, the response needed only to reflect the criteria of the stimulus wh-word to be scored as appropriate, regardless of whether or not the response reflected the answer expected from the stimulus picture. During the testing sessions, the questions were repeated upon request, since memory was not being tested (Gullo, 1979; 1982).

To test the hypothesis a three-between two-within subjects Analysis of Variance (ANOVA) was administered to ascertain differences between Urban Black preschool children between the ages of 3 and 5 years old in their ability to appropriately respond to wh-questions. The between subjects variables were the age, sex, and order of presentation of the stimulus option. The within subjects variables were the repeated measures of stimulus option and wh-word type. The criteria for the level of significance was set at p .01.

Findings

Table 1 lists the appropriate score means and standard deviations for each stimulus condition by age levels.

TABLE 1

STIMULUS OPTIONS APPROPRIATE

SCORE MEANS AND STANDARD DEVIATIONS BY AGE LEVELS

Age Level		Single Option	Multiple Option
Early 3's	Mean	0.65	0.59
	S.D.	0.93	0.85
Late 3's	Mean	1.07	0.88
	S.D.	0.91	0.85
Early 4's	Mean	1.23	1.14
	S.D.	0.67	0.66
Late 4's	Mean	1.48	1.28
	S.D.	0.58	0.54

The prediction that there were developmental differences in Urban Black preschool boys and girls between the ages of 3 and 5 years rate of appropriate responses to oral wh-questions (who, what, why, where, and when) when pictorial stimuli were presented based on age group (Early 3's; Late 3's; Early 4's; Late 4's), was supported by the results of the ANOVA. As expected, the rate of appropriate responses in both the Single and Multiple Option Stimulus Option increased with age. This developmental notion is consistent with other wh-question comprehension studies (Ervin-Tripp, 1970; Tyack and Ingram, 1977; 1982; Cairns and Hsu, 1978; Gullo, 1979; 1982).

Table 2 reports the appropriate score means and standard deviations for the age by wh-word interaction.

TABLE 2

APPROPRIATE SCORE MEANS

AND STANDARD DEVIATIONS FOR AGE X WH-WORD INTERACTION

		Who	What	Why	Where	When
Early 3's	Mean	0.80	0.88	0.85	0.43	0.15
(N=20)	S.D.	0.94	1.04	1.03	0.85	0.50
Late 3's	Mean	1.35	1.18	1.20	0.80	0.35
(N=20)	S.D.	0.88	0.94	0.96	0.86	0.74
Early 4's	Mean	1.58	1.75	1.63	0.78	0.20
(N=20)	S.D.	0.75	0.58	0.62	0.79	0.57
Late 4's	Mean	1.78	1.93	1.63	1.30	0.28
(N=20)	S.D.	0.49	0.28	0.57	0.75	0.60

A Tukey post-hoc test (Kirk, 1968) was used to determine whether significant differences existed between the means for the variables of age by wh-word to further confirm the results of the ANOVA.

Summary of Tukey Test Results

The results of the Tukey test support a significant difference found in the age x wh-word type interaction in that the early three-year-old's appropriate score means were significantly lower than the latter two age groups when responding to the who, what, and why questions. Possible explanations for this result may be that the younger preschoolers in this study had problems in recognizing the objects in the pictures and that they were also not yet at the developmental level necessary for comprehending who, what, and why questions (Gullo, 1979).

In addition, the results of the Tukey test indicate that the "where" and "when" questions appeared to be too difficult for all four age groups in this study to comprehend based upon their low appropriate score means. A possible explanation for this result may be related to Piaget's (1971) notion of the abstract constructs of space and time being too difficult for preschoolers to grasp. An interesting finding is that there is some evidence of improvement in the late four-year-olds' appropriate score means for the "where" question. This result suggests that the four-year-olds in this study were better able to comprehend the "where" question than the other three groups.

Discussion

As predicted, the results revealed significant differences based on age levels of the children in this study. This result was further supported by a

significant difference found in the age by wh-word type interaction. It was found that certain wh-word constructs were acquired earlier than others. In this study, the earlier acquired wh-words were ("who," "what," and "why"), while the later acquired wh-words were ("where" and "when"). This order of acquisition was attributed to the inability of the preschoolers to fully comprehend the abstract constructs of space and time (Piaget, 1971).

The results suggest that pre-service teachers, specifically those in the early childhood education field, become aware of the importance of questioning in the teaching-learning context. They can be provided the opportunity to participate in field experiences which will enable them to practice asking questions, specifically wh-questions, to ascertain what type of questions are understood by preschoolers.

In addition to field experiences, undergraduate education students, preschool teachers, and parents can be given instructional training that could be utilized to help them strengthen their question-asking skills such as observing the following: 1) the ability to comprehend wh-questions depends on the age of the child, 2) some wh-question constructs are understood earlier (who, what, and why) than other wh-question constructs (where and when).

Such instructional experiences may include tape-recordings of teaching-learning situations or informal discussions with classmates or friends. As a result of utilizing the tape recording technique, teachers may become aware of other areas that could contribute to their ability to enhance children's learning experiences. For example, teachers may find out that they are asking too many questions without a sufficient amount of "wait-time" to allow for children's

responses.

As a result of this study, the following recommendations are presented as possibilities for future research. It is recommended that further research on children's comprehension of wh-questions be conducted by using an older sample to determine at what age the where and when questions are acquired. Another research possibility could be to look at social class differences or include other cultural groups as part of the study. It is the investigator's contention that this study may serve as a starting point for many training sessions to enhance the questioning skills of early childhood educators.

APPENDIX

SINGLE OPTION STIMULUS CONDITION QUESTIONS

1. Who is the dog jumping?
2. What is the girl jumping?
3. Where is the boy running?
4. Why is the boy jumping?
5. When is the dog jumping?
6. What is the boy jumping?
7. Where is the girl jumping?
8. Why is the boy running?
9. When is the boy jumping?
10. Who is the dog jumping?

MULTIPLE OPTION STIMULUS CONDITION QUESTIONS

1. Who is the dog jumping?
2. Where is the girl jumping?
3. Why is the boy running?
4. When is the boy jumping?
5. What is the dog jumping?
6. When is the dog jumping?
7. What is the girl jumping?
8. Where is the boy running?
9. Why is the boy jumping?
10. Who is the dog jumping?

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